

Fault-Tolerant Scheduling in Distributed Real-Time Systems ^{*}

Nguyen Duc Thai

Institute of Informatics, Slovak Academy of Sciences, Dubravská cesta 9, 845 07
Bratislava, Slovakia
thai.ui@savba.sk

Abstract. Enhancing the reliability of a system executing real-time jobs is, in many cases, one of the most important design goals. A dynamic re-configurable system offers an approach for improvement of reliability. To achieve high reliability, the most suitable recovery action must be used when a fault occurs, which means that some kind of optimal recovery strategy should be followed. In this paper, we suggest a method to analyze the schedulability of a task set in distributed systems and enhance the reliability of the systems.

1 Introduction

Real-time systems are those systems in which the correctness of the systems depends not only on the logical results but also on the time at which the results are produced [1]. Real-time tasks, which have more deterministic properties when compared to tasks in general computer systems [5][6][7] are characterized by deadline, release time and execution time. The design of a real-time system needs to ensure high levels of reliability and fault tolerance. The system should be able to tolerate various kinds of failures and still finish the mission successfully. High levels of reliability can be achieved using massive hardware redundancy, fault tolerant scheduling schemes and incorporation recovery strategies, in order to minimize the probability of failure. The reliability $R(t)$ of a system is the probability that a system will provide the specified service until time t , given that the system was operational at $t = t_0$ [2]. If a system has a constant failure rate of failures/hour, then the reliability at time t is given by $R(t) = e^{-\lambda(t-t_0)}$

This paper is concerned with providing a method to improve reliability and productivity of real-time systems. Section 2 describes the system model and assumptions used in the paper. In section 3 we propose a method to improve reliability of the system in order to get better performance. Section 4 shows experimental results and Section 5 concludes the paper.

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